Center for Scientific Review Advisory Council Meeting
National Institutes of Health
U.S. Department of Health and Human Services

May 2, 2011 — Meeting Minutes

The Center for Scientific Review Advisory Council (CSRAC) convened at 8:30 a.m. on Monday, May 2, 2011, at the Natcher Conference Center on the NIH campus in Bethesda, Maryland. The entire meeting was held in open session. Dr. Antonio Scarpa presided as chair.

Members Present

Bruce Alberts, Ph.D.
Etty N. Benveniste, Ph.D.
John T. Cacioppo, Ph.D.
Alice M. Clark, Ph.D.
David Korn, M.D.
Antonio Scarpa, M.D., Ph.D.
Marie Krousel-Wood, M.D., M.S.P.H.
Keith R. Yamamoto, Ph.D.

Cheryl A. Kitt, Ph.D., was the executive secretary for the meeting.

I. Welcome and Introductions

Dr. Kitt welcomed attendees to the first meeting of the newly formed CSRAC and turned the floor over to CSRAC Chair Dr. Scarpa.

Dr. Scarpa explained how CSRAC came about. In 2005, the Peer Review Advisory Committee was set up to advise on peer review conducted through both the NIH Center for Scientific Review (CSR) and the NIH Institutes and Centers (ICs). In practice, most of the focus was on CSR, so NIH Director Collins approved a CSR advisory council.

II. NIH: Future, Plans, Priorities

NIH Deputy Director Dr. Lawrence Tabak presented an "environmental scan" of NIH, as well as updates on possible new organizational structures for translational and therapeutics research, and for substance use, abuse, and addiction research.

Environmental Scan

- ***Current and future trends:*** Dr. Tabak discussed workforce diversity and trends in scientific output and education. Compared to the general population, a very small percentage of African Americans and Latinos are principal investigators of NIH-funded research. As defined by publication output, the European Union and, most recently, Asia are more productive than the United States, with dominance in physical and mathematics sciences. The United States ranks 29th out of 109 countries in the percentage of 24-year-olds with a math or science degree, and last of 40 countries in rate of progress in innovation-based competitiveness, according to the Atlantic Century. NIH established a

working group to examine the future biomedical research workforce, given these trends. It will look at such issues as optimal size of the workforce, types of positions to support, and training.

- ***Funding:*** NIH had a 1 percent decrease in its budget; adjusted for inflation, resources are back to 2001–2002 levels. Eighty-four percent of NIH resources are directed outside the agency, supporting 325,000 scientific and research personnel.

Translational and Therapeutics Research

- ***Current situation:*** A 2010 trans-NIH inventory identified 550 activities of varying sizes in this area, about 65 percent in preclinical and 35 percent in clinical research. According to a recent paper in the *New England Journal of Medicine*, 153 drugs and vaccines over the past 40 years were discovered through public-sector research. The article concluded "public-sector research has had a more immediate effect on improving public health than was previously realized."
- ***Recommendations to NIH:*** Dr. Collins asked the Scientific Management Review Board (SMRB) how NIH could better support translational and therapeutic sciences. The SMRB recommended a new translational medicine and therapeutics center, which could encourage collaborations and partnerships across sectors, provide resources, and enhance training, especially in sub-disciplines with shortages of professionals.
- ***Integrated approaches:*** The new National Center for Advancing Translational Sciences (NCATS) would facilitate, not duplicate, NIH-supported translational research; complement, not compete with, the private sector; and reinforce, not reduce, NIH's commitment to basic research. As examples, NIH has been involved with the Tox21 consortium, convened a roundtable with industry to explore new uses of abandoned and approved therapeutics, and published—through the Chemical Genomics Center—a list of all small-molecule drugs approved for human or veterinary use.
- ***Programs in a proposed NCATS:*** The center would bring together six existing programs and one new initiative. The new initiative is the Cures Acceleration Network, established by the Affordable Care Act. A task force is looking at how this center might be set up. If approved, it would take effect October 1, 2011.

Substance Use, Abuse, and Addiction Research

The SMRB also recommended creation of an institute to focus on substance use, abuse and addiction (SUAA) research and related public health initiatives. It would integrate relevant research portfolios from other ICs.

An SUAA task force is analyzing how an institute would operate and soliciting feedback in order to provide final interim recommendations to the NIH Director by the fall of 2011. If approved, a new institute would begin on October 1, 2012. [Subsequent to the meeting, the NIH Director determined that additional time was needed to review and integrate the SUAA portfolio before building the proposed institute. The targeted timeline for the proposed institute is October 1, 2013 (FY 2014).]

III. CSR Peer Review Updates

Dr. Scarpa spoke on challenges and opportunities in peer review. After he gave an overview of CSR activities, he discussed the drivers for change, and enhancements within CSR and NIH as a whole. He also presented the Marcy Speer Outstanding CSR Reviewer Award.

CSR Activities

- ***Workload and CSR structure:*** While the number of applications is down from the spike created by the American Recovery and Reinvestment Act (ARRA), CSR received 88,000 applications in 2010, a 20 percent increase over two years ago. CSR reviewed 64,000 of them in 1,700 study sections involving 17,000 reviewers. Throughout, the number of Scientific Review Officers (SROs) has remained constant at 240. About 65 percent of the applications were reviewed in standing study sections, with others reviewed in Special Emphasis Panels (SEPs) or in recurring SEPs.
- ***Review outcomes for T1s and T2s:*** Recently produced data on the review outcomes for Type 1 (new) and Type 2 (renewal) R01 grants show T2s are twice as successful as T1s. Dr. Scarpa asked CSRAC to consider if this discrepancy should be a concern.

Four Drivers for Change

- ***NIH budget:*** The payline affects the applicants and the process.
- ***Number of applications:*** As noted above, applications are down from ARRA levels, but still high. More investigators are applying, and they are applying more frequently. In 2000, principal investigators submitted an average of 1.3 applications. In 2010, it was 1.5. Submission of R21 grant applications has risen 10-fold since 2000. More than 100 program announcements with different criteria use the R21, which makes review difficult.
- ***Reviewers' load:*** In 1997, reviewers reviewed an average of 12 applications each. The average went down to six in 2005, and is now up to nine. Too small a load creates a need for more reviewers and creates larger review meetings with different group dynamics.
- ***CSR budget:*** NIH has been generous, but CSR needs to continuously look for efficiencies. Some measures to improve peer review, such as holding meetings on the West Coast, have resulted in cost savings.

Enhancing Peer Review in CSR

Dr. Scarpa discussed how CSR is enhancing peer review by:

- ***Improving study section alignment*** through input from the community, internal Integrated Review Group (IRG) reviews, open houses, and CSRAC.
- ***Revising study section guidelines*** posted on the Web.

- ***Shortening the review time*** to about 3 months from submission to posting summary statements. Applicants can resubmit in the very next review cycle if they wish.
- ***Advancing additional review platforms***, which help recruit reviewers and, though not the principal motivation, save money. A survey shows high satisfaction with these new platforms. An editorial board-type review system is also used for some applications.
- ***Recruiting the best reviewers*** through such successful strategies as moving one meeting per year to the West Coast, providing additional review platforms, developing a national registry of volunteer reviewers, offering a reward in the form of no submission deadline for chartered members, and allowing more flexible ways to fulfill a term of service.

Dr. Scarpa briefly touched on additional issues: enlarging published rosters for small SEPs, evaluating new versus A2 applications, sunsetting submission of additional materials in an application, and emergency participation in review meetings by phone.

Enhancing Peer Review in Corporate NIH

Dr. Scarpa reviewed other enhancements throughout NIH:

- ***Reviewing highly transformative research*** through the Transformative R01. Now in its third year, the T-R01 is evaluated through both general and more specialized reviews.
- ***Increasing support for early stage career investigators (ESIs)*** so they can establish careers earlier. The proportion of ESIs funded went from about 22–23 percent to 30 percent.
- ***Funding the best research earlier:*** Preventing applicants from submitting a third resubmission (A2) means that NIH will make more A0 and A1 awards.
- ***Focusing on impact and significance*** to improve the quality and transparency of the peer review process. Other enhancements include a shorter application with bulleted critiques and the new 1-to-9 scoring system.
- ***Ordering reviews*** to address the concern about variation of scores at different times in a meeting. The solution has been to "recalibrate dynamically" by discussing applications in order of the average preliminary scores from their assigned reviewers.
- ***Enhancing training*** for CSR and NIH review staff, chairs, and reviewers.

Continuously Reviewing the Changes

NIH continues to ask for feedback on changes. Dr. Scarpa reviewed key findings from a survey of applicants and reviewers in December 2009 and of advisory councils in January 2010:

- Councils have the necessary information from reviews to make decisions
- Reviewers like the 9-point scoring scale
- The overall impact score is not the average of criteria scores
- Approach remains the most influential criteria score
- Clustering applications of early and established investigators works
- A new change is to have the reviewer write an overall impact paragraph

Marcy Speer Award

Dr. Scarpa concluded his presentation by presenting the Marcy Speer Outstanding CSR Reviewer Award to Dr. Alice Clark. He spoke of her contributions in terms of breadth and quality of service. Dr. Clark thanked Dr. Scarpa and those who have supported her. She praised Dr. Speer's deep commitment to peer review, her compassion, and her generosity of spirit.

Discussion Highlights

- ***What is the rationale for the termination of supplemental materials?*** Dr. Scarpa said for some program projects, supplemental materials are allowed. However, the review time for an R01application is now cut in half. Also, the expectation was becoming that an applicant had to send additional material, which meant tens of thousands of supplements.
- ***How does CSR ensure study sections are in the right IRG and are functioning well?*** The process to identify problems, such as a study section that is too small or science that has changed, is ongoing. One method to ensure they are rating the most outstanding work is an impact analysis, as presented later in the agenda.
- ***What is the faculty rank within SEPs compared with study sections?*** There is little difference; some junior faculty participate with a limited load before taking on the role of a full reviewer.
- ***What instructions are given to study sections about reviewing the applications of ESIs?*** SROs might remind the chairs, for example, that ESIs will not have the same number of publications as more experienced investi***g***ators. However, as shown with clustering, review outcome has not changed.
- ***What is being done to improve transparency?*** The CSR Web site has substantial detail about the review process. Dr. Scarpa said he welcomed other suggestions.
- ***How is it decided whether to consider an applicant's other funding in a study section review?*** Dr**.** Alberts said, when he chaired a study section, he received instructions that reviewers not consider the total dollar amount of other funding, but that the study section had this information and considered it when judging the application. Dr. Korn said the absolute total funding received was not a factor in the decision about the merit of an application when he participated in reviews, nor should it be. Dr. Alberts pointed out that, without such information, the study section has no good way to measure an investigator's past productivity, since for this purpose, research output needs to be calculated as productivity per amount of resources available. Without such information, we are biasing funding toward those with large (presently undeclared) resources, which is unfair and counterproductive for the scientific enterprise as a whole. He urged that this information be included in grant applications, as it was in the 1980s.

  Dr. Scarpa said the Office of Extramural Review sets overall NIH policy on this issue, rather than CSR. ICs can also decide how to handle this information, as the National Institute of General Medical Sciences has done. However, an investigator who attempts to submit the same application for different funding opportunities at the same time is flagged through peer review.

IV. Impact Analysis of CSR Study Sections

Dr. Sy Garte, Director of CSR's Division of Physiological and Pathological Sciences, explained an impact analysis approach to determine if study sections are equally capable of identifying applications with high scientific impact.

Methodology

The analysis focused on 144 study sections in operation for five years and used an evaluation tool called eSPA, developed by the National Institute of Allergy and Infectious Diseases. The tool finds the papers published from the research from any grant, citations attached to the papers, and impact factors of the journals where the papers were published.

The analysis looked at these metrics individually and as a composite, termed the Single Impact Metric (SIM). The raw data revealed a large range among the study sections. The next step was to determine if study sections perform differently or if confounding factors account for the discrepancy. Confounding factors included grant award size; the proportion of R01s versus R21s, new/ESI awards, Type 2, and clinical applications reviewed by a study section; the percentage of highest scoring grants reviewed; and the field of science.

Field of Science Mapping

An outside firm mapped how 29 study sections connect to different fields of science. For example, the map of the Musculoskeletal Tissue Engineering indicates that it is a "broad" study section that touches many fields and thus could relate to many relevant publications. In contrast, the Membrane Biology and Protein Processing map shows a more narrow study section that relates to far fewer fields of science.

The mapped study sections were compared with U.S. and world Average Relative Citation (ARC) metrics. More than 90 percent scored higher than both the U.S. and world ARC averages, a few were equal, and one, which will be closely examined, fared worse.

Further analysis found field of science is a significant confounding factor in analyzing impact. Using raw data of citations per paper, for example, one study section ranked 27th. After correction for the field of science, it ranked third. (If the field has fewer journals, by extension there are fewer possibilities for citations.)

Overall Findings

The mapping of the 29 study sections was extrapolated to 142 of the 144 study sections selected for analysis. Dr. Garte stressed the data are rough and very approximate. Given these limitations, the average impact was 1.5: that is, the awarded applications that our study sections considered scored 50 percent better than the U.S. average. Fifteen percent of the study sections were at twice the U.S. average, and about 5 percent scored below it. CSR may use the tool to look at problem study sections in the future, determine the most appropriate platform for review, make study section assignments, or determine areas of science that need further attention.

Discussion Highlights

- ***Have you looked at study sections before and after the recent application and reviewer changes?*** Dr. Garte said the tool can be used for this purpose in the future.
- ***What can you say about the top and bottom impact study sections?*** The CSR division directors went back to look at the seven lowest-impact study sections. Not all of the information is in, but the issues had already been addressed in at least two of them. As for the very top ones, one possibility is they cover very competitive fields with very productive scientists. Council suggested that perhaps the analysis indicates these study sections should be divided into two.
- ***Is this an analysis at one point in time? If so, caution is needed before making too many decisions based on it.*** The analysis is a snapshot, and as noted, problems in two study sections had already been corrected.
- ***Is there concern about metrics based on publication? For example, really bold research could have a hard time getting published.*** The bibliometrics in this analysis, like all metrics, can only provide very rough estimates, and should be treated as such.
- ***What are the plans for this analysis going forward?*** CSR will use the mapping data so the right science is aligned in the right study section (see presentation below) and perhaps for other purposes.

V. Application Assignments *in silico*

Dr. George Chacko, CSR Office of Planning, Analysis and Evaluation, extended the discussion on mapping fields of science to automating the process of assigning applications for review based on fingerprints of application content. In the existing system, largely driven by humans, applications come in to CSR's Division of Receipt and Referral, where they are redistributed to IRGs and ultimately to study sections. CSR is exploring whether an initial sort by software to study sections followed by refinement conducted by experts (SROs and referral staff) would provide greater efficiencies in all aspects of the process.

Thinking Outside the Box

The hypothesis tested reverses the current system, so applications go to SROs, who pass along those that do not fit in their study sections, with the referral system dealing only with those that need reassignment.

The decision about where to refer an application is initially based on science and then on administrative considerations, such as conflicts of interest or justified requests from applicants. The experiment compared software predictions against historical assignment data. The experiment was developed with volunteer study sections in the Division of Basic and Integrative Sciences. The software (named LIKE) was trained on the science, but not administrative issues. The principal criteria to evaluate LIKE was accuracy against the historical record and concurrence by experts (SROs and chiefs). The software had a modest success rate in predicting the best assignment, but the accuracy increased significantly if it was used to predict the three most likely study sections. A high false negative rate was observed at the study section level that

was only partially attributable to the experimental conditions. The software-human combination is very sensitive to detecting true positives.

Future Plans

The next step is to run LIKE under optimal conditions, as well as to examine other software options. The main question is, once optimized, is the software useful. If not, the experiment will not be expanded for wider use. Dr. Chacko concluded by thanking the team involved.

Discussion Highlights

- ***What would happen to the false negative rate if the fingerprinting were based on applications funded, rather than on all applications that went to a study section?*** Dr. Chacko agreed that this was a valuable test and said this could be looked at in the future.

VI. Update on CSR Realignments

Dr. Don Schneider, Director of CSR's Division of Basic and Integrative Sciences, reported on recent efforts to align study sections to stay current with science. Continuous evaluation and alignment of study sections is necessary because science changes, study sections work best at an optimum size, and SEPs should ideally be discontinued or chartered after a year. Alignments also reflect CSR core principles.

The process for realignments, which takes about nine months, encompasses identifying an issue, conferring with stakeholders, reporting to CSRAC for its consideration, and then seeking the CSR Director's approval or disapproval.

Small Business

Dr. Schneider described a proposal to realign seven small panels within the Interdisciplinary Molecular Sciences and Training (IMST) IRG that handle the Small Business Innovation Research proposals (SBIRs) for his division:

- ***Form three larger clusters:*** (1) Biochemistry, Biophysics, and Drug Discovery; (2) Basic and Integrative Bioengineering; and (3) Cell and Computational Biology and Genetics.
- ***Divide each cluster into two mirror panels, each with about 100 applications.*** Staggered meeting times would ease the burden both for applicants and program staff. The study sections would use an editorial board review system, already piloted with positive results.
- ***Proposed:*** In October/November 2011, pilot editorial review of all SBIR applications assigned to the Division of Basic and Integrative Sciences, with two meetings a round and plans to charter reviewers in October 2012.

Fellowships

Dr. Schneider acknowledged the longstanding need to increase efficiency in reviewing fellowship applications, while still maintaining effectiveness. Again, the IMST IRG, which handles fellowships for his division, is serving as a pilot.

- ***Modified review pilot:*** As first proposed by the NIH Extramural Activities Working Group, reviewers will submit critiques and preliminary scores via the Internet Assisted Review (IAR) system. The top 10 percent and bottom 40 percent will not be discussed unless a reviewer requests otherwise. Others will be discussed by phone and voted on via IAR. All applications will receive a summary statement with two critiques. The top 10 percent and those discussed will also receive brief resumes.
- ***Realign the panels:*** Six existing fellowship panels that review from 20 to 85 applications each will be merged into four larger panels. Reviewers for all fellowships are seasoned scientists with experience in training.
- ***Proposed:*** Implement the pilot in October/November 2011.

Genes, Genomes and Genetics IRG

Dr. Schneider explained that, during a past reorganization, three nearly identical study sections were formed (Molecular Genetics A, B, and C), under the assumption that the field would grow. In fact, they have all remained medium-sized, and three study sections somewhat dilutes reviewer expertise.

- ***Proposed:*** Realign to create two molecular genetics study sections as twins that will meet in staggered fashion early and late in a round, beginning in October. A group is forming to figure out how to handle a small subsection of applications, i.e., those with a focus on the cell biology of the nucleus.

Several points were raised in this part of the presentation:

- ***Will there be a potential logjam of applications?*** Dr. Schneider said the change is expected to be implementation-neutral, but CSR will monitor any effect.
- ***Are there data that certain fields of science have a culture of applying for grants more frequently? If so, does that mean they are funded more often than other fields?*** Dr. Schneider said he thinks the end of the A2 has meant people apply less frequently and more thoughtfully. However, some SBIR applicants submit multiple proposals in a single round and this can hurt them, since reviewers can spot derivative applications.

Surgical Sciences, Biomedical Imaging, and Bioengineering IRG

Dr. Schneider presented on behalf of Dr. Joy Gibson, Director of CSR's Division of Translational and Clinical Sciences. The Biomedical Imaging and Technology (BMIT) study section in this division routinely reviews 120+ R01 applications a round, and an additional 70+ related R21s are reviewed in a separate SEP. A working group considered various options before recommending one.

- ***Proposed:*** Split BMIT into twin study sections, BMIT A and BMIT B and consider the possibility of running them as staggered meetings.

Digestive, Kidney, and Urological Systems IRG

Dr. Schneider presented on behalf of Dr. Garte a recommendation to realign and fine-tune guidelines to more efficiently manage the workload in the Digestive, Kidney, and Urological Systems IRG and to better match reviewer expertise with applications.

- ***Proposed:*** Consolidate development applications in Cellular and Molecular Biology of the Kidney study section; and incorporate urology SBIRs and prostate cancer R01s into the Urologic and Kidney Development and Genitourinary Disease study section. Although unusual, there are precedents for a hybrid study section that reviews R01s and SBIRs.

As Dr. Schneider left the podium, Dr. Scarpa noted his impending retirement as Director of CSR's Division of Basic and Integrative Sciences, but not from NIH. He thanked Dr. Schneider for his many contributions.

Molecular, Cellular, and Developmental Neuroscience IRG

Dr. René Etcheberrigaray, Director of CSR's Division of Neuroscience, Development and Aging, discussed chartering a new Drug Discovery for the Nervous System study section from a SEP originally created to review applications related to Alzheimer's disease. The SEP grew to include other disorders and a broader applicant pool. A working group unanimously endorsed chartering a study section.

- ***Proposed***: Charter this long-standing SEP into a study section.

Visual Sciences

Current study sections in the visual sciences are based on anatomy: anterior eye disease, biology and diseases of the posterior eye, and central visual processing. Consideration of alternatives began in 2008. After much discussion and consultation with the community, the proposed alternative focuses on scientific content, with a clinical/translational study section, a basic science study section, and a study section that combines central visual processing with related cognitive processes. A working group endorsed the general concept and felt the benefits outweighed traditional approaches.

- ***Proposed***: Form three new study sections: Biology of the Visual System; Diseases and Pathophysiology of the Visual System; and Sensory, Perceptual and Cognitive Processes.

Dr. Scarpa said CSRAC will be more involved in these deliberations in the future. He reflected the sense of the group that there was some caution about a few of the proposed changes, but nothing to preclude moving forward.

VII. Peer Review: New Views

The last session was structured for open discussion and feedback to questions posed by Dr. Scarpa.

General Discussion

Elimination of the A2: Dr. Yamamoto started a discussion on the new NIH policy that eliminated A2 applications. He said many investigators are especially concerned about the requirement that a proposal be substantially changed if not successful after the A1.

Dr. Scarpa noted that NIH already had a limit on application resubmissions. The only change was to shift the limit from A2 to A1. The guidelines for determining what is a new application or a resubmission remain the same. He then explained that the elimination of the A2 was a trans-NIH policy change.

Collaborative nature of science: Dr. Cacioppo noted the number of staff on proposals seems to grow as science becomes more interdisciplinary. With a flat extramural budget anticipated for the next few years, how can these best be handled? Dr. Scarpa confirmed that R01s are coming in with more people involved, more modules, and generally more complexity. Data on the percentage of multiple principal investigators, and how that has changed over time, could be provided before the next CSRAC meeting.

Overcoming conservative decision-making: Dr. Cacioppo suggested one possibility to reduce the perceived bias that study sections are conservative in their reviewing is more information sharing with ICs—not to influence decisions but to provide more forward-looking input about where the science is going. Dr. Scarpa agreed every input is useful, and some interaction already takes place, but said NIH peer review is based on the separation of program, staffed by Federal employees, and peer review, composed of scientists who are not Federal employees. Tight money is a factor behind a trend toward more conservative research, which is the reason behind the T-R01s and other alternatives.

Encouraging innovation: Dr. Scarpa said about 300 researchers applied in the last round of the T-R01, a decrease from the previous two years. Some young researchers, Dr. Alberts said, feel if their idea does not work, as might well happen in a T-R01, they jeopardize their future. As an alternative explanation for declining numbers, Dr. Yamamoto said perhaps 300 is a realistic steady state, given the rare occurrence of true paradigm-changers.

The R01 has a criterion to recognize innovation. Dr. Scarpa said when he reads summary statements to get a sense of the applications being submitted, some are clearly innovative while others try to make a case for innovation that is not really there.

Internet Assisted Review (IAR) platform: Dr. Krousel-Wood asked if quality metrics exist to assess how well the IARs are working, given that limited funding might mean more such reviews. Dr. Scarpa said the main reason for IARs is not to save money but to involve reviewers

who could not otherwise participate. Face-to-face interaction is lost, but IARs have advantages over traditional meetings, and surveys show general satisfaction with them. CSR is continually looking at innovative ways to conduct reviews and to evaluate the methods used.

Academic medicine and funding: Dr. Korn raised concern about the academic medical enterprise and funding in a tight budget environment. Faculty appointments, for example, are usually built on grants and other soft money. He urged NIH, with community participation, to consider the implications of fiscal limitations for the future of the enterprise and of the country. NIH actions can potentially cause great dislocations. Buy-in from the leadership of the academic medical community is needed.

Feedback Requested by Dr. Scarpa

Involving new reviewers: Dr. Scarpa asked for CSRAC feedback on involving early-career reviewers in study sections by assigning them a lighter load. Most members supported the idea, but Dr. Yamamoto raised the point that assistant professors should instead be establishing their own programs. Staff will send the guidelines for selecting early-career reviewers to CSRAC.

Established investigators and Type 2s (T2s): Dr. Scarpa again raised his concern that established investigators generally score higher on T2 versus new T1 applications. The sense of the committee was that T2s receive high scores if they are going in a new direction and did not share the concern. Dr. Benveniste noted, for example, that while an impressive publications list shows productivity, a Type 2 application still has to represent a new direction if it is to succeed.

Proliferation of R21s: CSRAC agreed with Dr. Scarpa that the proliferation of R21s pose a challenge for reviewers. CSR will provide more data to CSRAC on how R21s are used to continue the discussion.

Editorial board-type reviews: Dr. Yamamoto asked about the different ways editorial board-type reviews are deployed throughout CSR. Dr. Scarpa said, when done well, they can be a much better mechanism of review, because specialists evaluate the individual science and generalists look at overall impact and significance. One way to drive creativity, Dr. Alberts suggested, is for generalists to look at applications before they go to the specialists, as some publications do.

With no further comments or questions, Dr. Scarpa again thanked CSRAC for their participation. The meeting adjourned at 3:40 p.m.

We do hereby certify that, to the best of our knowledge, the foregoing minutes of the May 2, 2011, meeting of CSRAC are accurate and complete.

*signed Don Luckett for

Cheryl Kitt, Ph.D.
Executive Secretary
Center for Scientific Review Advisory Council

*signed Richard Nakamura, Ph.D., for

Antonio Scarpa, M.D., Ph.D.
Chair
Center for Scientific Review Advisory Council